Section 78-24-27-93-3

EXTERIOR COATING SYSTEM FOR WELDED STEEL PETROLEUM STORAGE TANKS

02\93

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Includes Changes through Notice 3 (January 1997)

Latest Changes indicated by tokens

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PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.134	Respiratory Protection
29 CFR 1910.1000	Air Contaminants
29 CFR 1910.1200	Hazard Communication

FEDERAL STANDARDS (FED-STD)

FED-STD-595	(Rev B) Color Used in Government Procurement

MILITARY SPECIFICATIONS (MS)

MS MIL-B-131	(Rev H; Int Am 1) Barrier Materials, Watervaporproof, Greaseproof, Flexible, Heat Sealable
MS MIL-C-81907	(Am 1) Coating System, Polyurethane, Aliphatic, Weather Resistant. Process for Application of
MS MIL-C-85285	(Rev B; Am 2) Coatings: Polyurethane, High-Solids
MS MIL-P-3420	(Rev F) Packaging Materials, Volatile Corrosion Inhibitor, Treated, Opaque
MS MIL-P-24441	(Rev B; Am 1; Supple 1) Paint, Epoxy-Polyamide (Inch-Pound)

MILITARY STANDARDS (MIL-STD)

MIL-STD 161	(Rev. F; Notice 1 & 2) Identification Methods for Bulk Petroleum Products Systems Including Hydrocarbon Missile Fuels

STEEL STRUCTURES PAINTING COUNCIL (SSPC)

SSPC PA 2	(1991) Measurement of Dry Paint Thickness with Magnetic Gages
SSPC SP 10	(1994) Near-White Blast Cleaning
SSPC VIS 1	(1989) Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs)

1.2 SYSTEM DESCRIPTION

This specification covers the requirements for epoxy/polyurethane coating systems for exteriors of newly constructed steel tanks for storage of petroleum products.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-06 Instructions

Coating System; GA.

Three copies, before application, of the supplier's (formulator's) printed instructions which include brand names, catalog numbers, and names of manufacturers. Instructions shall include detailed mixing and application procedures except as modified herein, number and types of coats required, minimum and maximum application temperatures, curing procedures, pot life, and shelf life.

SD-08, Statements

Safety; GA.

Six copies of material safety data sheets (MSDS) for materials to be used at the job site in accordance with CFR 29 CFR 1910.1200.

SD-13, Certificates

Coating System; GA.

[Four] [_____] certificates of compliance attesting that the materials proposed for use meet the requirements specified.

1.4 DELIVERY AND STORAGE

Epoxy and polyurethane materials shall be shipped and stored out of the sun and weather, preferably in air conditioned spaces.

1.5 SAFETY

The Contractor shall ensure that employees are trained in the requirements of CFR 29 CFR 1910.1200 and understand the information contained in the

material safety data sheets for their protection against toxic and hazardous chemical effects.

1.6 JOB SITE REFERENCES

The Contractor shall have at least one copy each of SSPC SP 10, SSPC PA 2, and SSPC VIS 1 at the job site and which are readily available to the Contracting Officer.

PART 2 PRODUCTS

2.1 COATING SYSTEM

The coating system shall conform to the respective specifications and to the requirements specified herein.

2.1.1 Primer

Epoxy polyamide, zinc rich primer, formula 159 of MS MIL-P-24441.

2.1.2 Intermediate Coat

Epoxy polyamide, No. 50 gray intermediate coat, formula 157 of MS MIL-P-24441.

2.1.3 Topcoat

Polyurethane coating topcoat of MS MIL-C-85285, Type II (white FED-STD-595 color number 17925).

2.1.4 Vapor-Tight Material

MS MIL-B-131 or MS MIL-P-3420.

2.2 COLOR

Piping, conduit, and tank identification shall be in accordance with MIL-STD 161. Mark direction of fluids in accordance with MIL-STD 161.

PART 3 EXECUTION

3.1 SAFETY

Coatings specified may have potential health hazards if ingested or improperly handled. Follow manufacturer's written safety precautions throughout the mixing, application, and cure of the coatings.

3.2 PROTECTION FROM TOXIC AND HAZARDOUS CHEMICAL AGENTS

During tank cleaning, cleanup, surface preparation, and paint application phases, ensure employees are adequately protected from toxic and hazardous chemical agents which exceed the concentrations in CFR 29 CFR 1910.1000. Comply with respiratory protection requirements in CFR 29 CFR 1910.134.

3.2.1 Epoxy-Polyamide Coating Hazards

MS MIL-P-24441 formulations have a minimum flash point of 95 Degrees F (35 Degrees C). Solvent fumes from epoxy paint systems are combustible and toxic. Take suitable precautions to prevent their accumulations. In

addition to fire and toxic hazard, epoxy coatings can cause allergic reactions when allowed to come in contact with the skin. Prompt skin cleanup after contact using soap and water, not solvents, is recommended. Solvents will thin and spread paint over the skin, permitting deeper penetration and increasing the hazard of a delayed allergic reaction.

3.2.2 Health

Operations shall be reviewed and approved by an industrial hygienist as to correctness of work procedures and personal protective equipment. Services of the industrial hygienist shall be obtained by the Contractor.

3.3 WEATHER CONDITIONS

Accomplish abrasive blasting and coating operations when the ambient air temperature is above 40 Degrees F, below 95 Degrees F, and the steel surface temperature is more than 5 Degrees F above the dew-point of the ambient air. Coatings shall not be applied to damp or wet surfaces.

3.4 SURFACE PREPARATION

Grind rough surfaces smooth on weld seams, sharp edges, and corners to a minimum of a 1/8-inch radius. Abrasive-blast surfaces to near-white metal in accordance with SSPC SP 10. Prior to commencing blasting, prepare a 12-inch square steel test-plate for the appearance shown in SSPC VIS 1. Submit the sample to the Contracting Officer. Use the approved sample test-plate as a standard of comparison for the tank surfaces throughout the course of work. Keep test plate wrapped and sealed using material specified in the paragraph entitled "Vapor-Tight Material" in order to retain the appearance. Blasting equipment shall be conventional air, force-feed, or pressure type. No type of water or vapor blast will be permitted. Provide nozzle of such size that a pressure of 90 plus or minus 10 psig is maintained at the blast generator. Filter and separate oil and moisture from the air supply, and determine quality of air by blowing through a clean cloth. Blast in sections or blocks small enough to permit application of the zinc-rich epoxy coating during the same working shift. Time interval between blasting and application of the zinc-rich epoxy coating shall not exceed 8 hours. Abrasive-blast surfaces shall match the prepared test-plate. After abrasive-blasting, clean surfaces by brushing, blowing with oil-free and moisture-free compressed air, or vacuuming. Free surfaces of dust and debris. Weld sharp depressions or deep pits and grind-off smooth.

3.5 APPLICATION OF COATING SYSTEM

3.5.1 General

Dry film thickness (DFT) coating system shall be as specified below. Complete coating system shall be:

a. 1st Coat: Formula 159 epoxy-polyamide zinc rich primer, MS MIL-P-24441; 2 to 4 mils DFT

b. 2nd Coat: Formula 157 epoxy-polyamide No. 50 gray intermediate coat, MS MIL-P-24441; 2 to 4 mils DFT

c. 3rd and 4th Coat: Polyurethane white topcoat, MS MIL-C-85285 Type II, 1-1/2 to 2 mils DFT each coat

3.5.2 General Procedure

Apply primer coat as soon as practical after abrasive blast cleaning. In no case shall the time interval exceed 8 hours. If visible rusting occurs; regardless of the time period, reblast the surface prior to applying primer coat. Coat exterior surfaces of the tank including steel roof, shell, stair, railing, and other exterior appurtenances. Coating system shall be applied by experienced applicators. Apply two coats of primer over corners, crevices, and welds. Apply the additional coat of primer by brush, working the material into corners, crevices, and welds, and outside corners and angles after the general application of the primer coat. Two coats of epoxy (Formula 159 and Formula 157) shall be applied successively allowing a drying time of not less than 16 hours nor more than 48 hours between coats for the epoxy coatings and no more than 16 hours for the MS MIL-C-85285 polyurethane. Each of the epoxy coats shall have a dry film thickness (DFT) from 2 to 4 mils and each of the polyurethane coats, 1 1/2 to 2 mils. The total dry film thickness (DFT) of the coating system shall be not less than 7 mils. If necessary to obtain the required minimum thickness of 7 mils an additional topcoat shall be applied within 16 hours.

3.5.3 Epoxy-Polyamide Coating Application

Epoxy-polyamide coatings, MS MIL-P-24441, may be applied by brushing, airless spraying, or dip application.

3.5.4 Tack Coat for Polyurethane Topcoat

Application of the polyurethane topcoat MS MIL-C-85285 shall be made after the second coat of the epoxy (Formula 157) has cured thoroughly (8 to 16 hours depending on the ambient temperature). If the epoxy coating cures for more than 16 hours, a tack or mist coat of 1 to 2 mils wet film thickness (WFT) shall be applied and dried 8 hours before applying the topcoat. Tack coat shall be the same material as the preceding coat of epoxy. If more than 7 days has elapsed since the last coat of epoxy, clean surfaces with water and detergent and rinsed clean with fresh water. If required, use solvents for grease and oil removal. Then apply a tack coat (1 to 2 mils WFT) of Formula 157 to the cured coat and allowed to dry approximately 4 hours before application of the polyurethane topcoat.

3.5.5 Application of Polyurethane Coating

Apply in accordance with MS MIL-C-81907.

3.6 FINAL INSPECTION

Following completion and curing of the coating system, inspect coated surfaces for pinholes, blisters, inadequate coating thickness, and other defects. Measure the dry film thickness in accordance with SSPC PA 2 at several random points throughout the tank as designated by the Contracting Officer. Repair imperfections found or so designated by the Contracting Officer. If the average measurements are less than the specified minimum dry film thickness, take additional readings in adjacent areas to define the extent of the thin area. Coat such areas with white polyurethane topcoat as necessary to achieve specified thickness. Apply coating within the conditions specified in paragraph entitled "Application of Coating System." Lightly brush blast or hand sand thin areas found to remove the glossy surface of the topcoat before applying additional topcoat if the topcoat was applied more than 48 hours in advance.

3.7 FINAL CLEANUP

Following completion of the work, remove debris, equipment, and materials from the site. Remove temporary connections to Government or Contractor furnished water and electrical services. Restore existing facilities in and around the work areas to their original condition.

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